genes (MNL 1959, p. 14). Such plants were male sterile, thus demonstrating that the ms_1 gene operates in S cytoplasm and is not inhibited by S restorer genes. We have now obtained ms_1ms_1 individuals with T cytoplasm and T restorers.

The procedure by which this combination was produced is the same as that described earlier, and takes advantage of the close linkage between the ms_1 and y loci. C103T$Rf_1rf_1Rf_2Rf_2YYMs_1Ms_1$ plants were crossed as female by a WF9 stock heterozygous at the ms_1 locus, i.e. WF9$rf_1rf_1rf_2rf_2YyMs_1ms_1$, and several fertile F_1 plants were selfed. White kernels on 2 segregating ears were planted. Ignoring X-overs, these white kernels should be of the genotype $yyms_1ms_1$, and 9/16 of them should carry the Rf_1Rf_2 genes. If the ms_1 gene does not produce male sterility in T cytoplasm in the presence of the T restorer genes, 9/16 of the plants from white kernels would be expected to be fertile. The actual results in the two families were 38 sterile:1 fertile and 39 sterile:0 fertile. The ms_1ms_1 genotype, therefore, must be unaffected by T cytoplasm and T restorers.

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1. Cytogenetic changes induced by vegetable oils in Zea mays - a preliminary study.

Certain vegetable oils have been found to induce cytological and genetic changes in wheat.[1] Based on these findings, a similar project was initiated[2] to study the effects of castor and peanut oils on corn.

Procedure. Corn seeds were treated by soaking in castor and peanut oils for periods of 6, 12, 18 and 24 hours. Wiped dry, the seeds were germinated in petri dishes. Controls of untreated seeds were also set up. Excised root tips were fixed in fresh Carnoy's acetic-alcohol for

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1. Swaminathan, M. S. and Natarajan, A. T. Cytological and Genetic Changes Induced in Vegetable Oils in Triticum. Journal of Heredity July-August, 1959. pp. 177-187.

2. This study was made possible by a grant under the National Science Foundation Teacher Research Participation Program. The project was carried out under the direction of Dr. Margaret Thompson, Department of Plant Breeding, Cornell University.

two hours, washed in 70% ethyl alcohol and then rinsed in water. If necessary, the root tips may be preserved at this point by allowing them to remain in the 70% ethyl alcohol. A 10% solution of formalin was used for hardening. The root tips were permitted to remain in the hardening solution for 4 hours. This was followed by treatment with 4% sodium hydroxide solution for 2 hours. The roots were then washed in water and immersed in 10% acetic acid to eliminate all traces of the sodium hydroxide. If the roots must be preserved for study at a future date, they may be placed in fresh 70% ethyl alcohol. The squash technique was used for the preparation of the root tips for staining. Aceto-carmine was used for staining.

Results. Table 1 indicates the number of mitotic figures and abberations that appeared for each of the time intervals and for the controls completed in this preliminary study.

Table 1

Frequency of mitotic figures and abberations in root tips of Zea mays treated with castor and peanut oils

Figures	Control	Castor Oil (No. of hrs.)				Peanut Oil (No. of hrs.)			
		6	12	18	24	6	12	18	24
Prophase	8	39	86	35	35	26	68	91	
Metaphase	18	37	52	52	35	56	99	56	
Anaphase	24	25	71	69	35	75	161	53	N
Telophase	4	22	25	32	22	21	29	57	o
Lagging at metaphase	2	21	14	13	4	15	13	3	
Two nucleoli	5	20	9	9	13	8	16	91	D
Binucleated	3	2	0	5	2	3	3	1	a
Lagging at anaphase	0	12	6	8	5	4	6	3	t
Anaphase bridge	0	10	8	8	5	5	17	8	a

Micronuclei appeared in a total of three cells from four root tips of seeds that had been treated for 18 hours with castor oil.

In the above data, cells were noted where the chromosomes failed to move with the others to the metaphase plate or to the poles during the anaphase. These chromosomes were found at random positions throughout the cell. Table 1 indicates these as "Lagging." Cells were also

noted where a bridge of chromosomes was formed from one pole to the other during anaphase. These are referred to in Table 1 as "Anaphase bridge."

Interpretation of the Data. In any interpretation of data, it is important that the number of cases be statistically significant. In this preliminary study, only one root tip was examined for each of the time intervals indicated in Table 1, with the exception of four root tips from seeds that had been treated for 18 hours with castor oil. The number of cells per root tip, however, was large. The following trends were noted:

1. The number of mitotic figures was greater in the treated seeds than in the controls. Since the root tips were cut the same length and at the same time of the day, the vegetable oils may be acting as a stimulant in cell division.

2. The number of cells with mitotic aberrations was greater in the treated seeds than in the controls. There was no apparent effect on the number of binucleated cells.

3. The number of cells with two nucleoli in the treated material (91) is significantly greater than in the control (5). Further data are required to determine the effect of the peanut oil on the role of chromosome 6 in the formation of the nucleolus.

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Fifteen commercial hybrids were placed in eight different 7 x 7 latin square experiments last summer. The arrangement of the hybrids within the plots and the plot locations are shown in Tables 1 and 2. Averages are for number of fertile (F.) and sterile (S.) tassels. Partial fertiles of all classes were included in the sterile count for each entry. Yield deviation is the total of the deviations for each of three pairs of restorer vs. normal version of a hybrid. Where the restorer version outyielded the normal one its deviation is a plus figure. LSD's at the 5% level are given in bushels per acre for each experiment. One general conclusion which may be drawn is that at no environmental region under test did the percent of fertile tassels reach the danger level. It is interesting to note in table 1 that the ratio of fertile to sterile tassels decreased at each extremity of the "corn belt." Also of interest is the indication from the same table that a higher plus yield deviation is correlated with the lowest ratio of fertile to sterile tassels. The negative yield correlations are disappointing but not discouraging. As restored versions of male parental lines are improved negative yield differences tend to diminish.

Loring M. Jones